



Defense Energy Support Center

Defense Energy Support Center

**Product
Technology
&
Standardization
Division**

Alternative Fuels Information Station

EPAct 2005 Tutorial



Learning Objectives



You should learn....

- Purpose of EPact 2005
- Summary of Basic Provisions of EPact 2005
- Provisions Applicable to the Department of Defense (DoD)
- How Compliance with EPact is being pursued by the DoD
- Summarized Requirements of Department of Defense Instruction 4170.11 “Installation Energy Management”

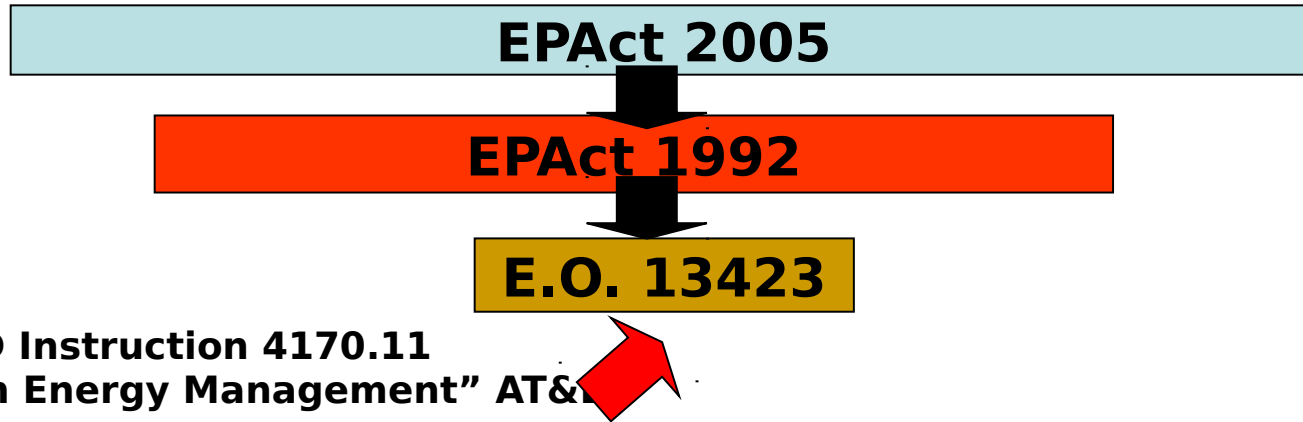


Purpose of EPAct 2005

- The Energy Policy Act of 2005 (EPACT) was signed by President Bush on August 8, 2005
- Intended to establish comprehensive, long range energy policy
- Provides Incentives for Traditional Energy productions
- Also provides incentives for newer more efficient energy technology
- Provides for energy conservation
- Promotes decreasing of US dependency on foreign



Department of Defense Compliance



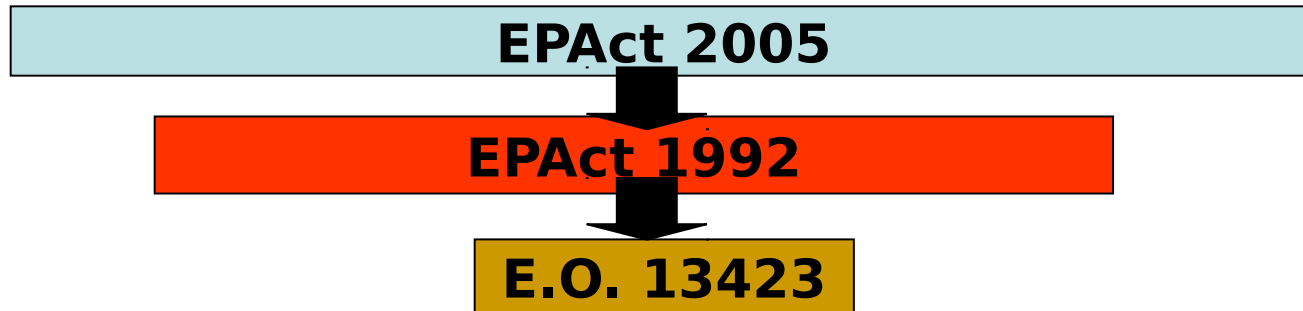
The Drivers for DoD to comply:

- (1) National Security
- (2) Energy Independence
- (3) EAct 2005
- (4) E.O. 13423

Link to <http://www.acq.osd.mil/ie/irm/Energy/Energy.htm> for more details



Department of Defense Compliance



DoD Instruction 4170.11
"Installation Energy Management" ATIL

DoD strategy establishes policy to satisfy all goals of:

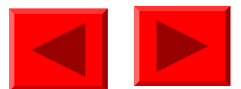
- (1) Energy Policy Act 2005**
- (2) Energy Policy Act 1992**
- (3) E.O. 13423, "Strengthening Federal Environmental, Energy, and Transportation Management", January 2, 2007**
- (4) DoD Directive 4140.25, "DoD Management Policy for Energy Commodities and Related Services" April 12, 2004**



Link to <http://www.acq.osd.mil/ie/irm/Energy/Energy.htm> for more details

EPAct 2005-Major Provisions

- Provides revised annual energy reduction goals (2% per year beginning in FY 2006)
- Provides revised renewable energy purchased goals
- Reauthorizes Energy Savings Performance Contracts (ESPCs) until October 1, 2026 (*DESC as of January 2007 has 9 active ESPCs*)
- Requires federal procurement of Energy STAR or Federal Energy Management Program-designated products.
- Updates federal green building standards with emphases on energy efficiency and sustainable design principles
- Mandates a variety of research and demonstration activities to stimulate the market for fuel cell vehicles and hydrogen energy systems



Energy Savings Performance Contracts



U.S. Department of Energy

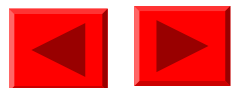
Energy Efficiency and Renewable Energy

An ESPC is a contracting vehicle that allows agencies to accomplish energy projects for their facilities without up-front capital costs and without special Congressional appropriations to pay for the improvements.

An ESPC project is a partnership between the customer and an energy services company (ESCO). In consultation with the agency customer, the ESCO designs and constructs a project that meets the agency's needs and arranges financing to pay for it.

The ESCO guarantees that the improvements will generate savings sufficient to pay for the project over the term of the contract. After the contract ends, all additional cost savings accrue to the agency.

More than 400 ESPC projects have been awarded by 19 different federal agencies in 46 states. \$1.9 billion has been invested in U.S. federal facilities through ESPCs, saving 16 trillion Btu annually, equivalent to the energy used by a city of about 450,000.



EPAAct 1992 and E.O. 13423 Key Regulations

Energy Policy Act 1992

**E.O. 13423:
Strengthening Federal Environmental, Energy,
And Transportation Management**

The Federal Fleet Program

EPAAct 1992

Requires that 75% of federal fleets' covered light duty vehicle acquisitions be alternative fuel vehicles (AFVs)

E.O. 13423

Sets goals for 30% reduction in greenhouse gases and 2% per year reduction in petroleum consumption by 2015.



Acquiring AFVs and using alternative fuels are integral to achieving this goal.

EPA Act 1992 and E.O. 13423 Key Regulations

E.O. 13423: Strengthening Federal Environmental, Energy, And Transportation Management

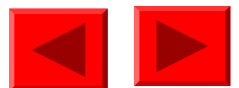
supercedes and revokes E.O. 13101, E.O. 13123, E.O. 13134, E.O. 13148, and E.O. 13149

- Reduce greenhouse gases by 3% annually through 2015 (or by 30% from year 2003 baseline) **(section 2(a))**
- Reduces consumption of petroleum products by 2% annually through end of year 2015.
- Increase total fuel consumption that is non-petroleum based by 10%
- Use hybrid vehicles where commercially available **(section 2(g))**



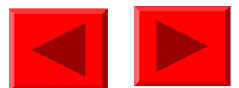
EPAct 2005-Energy Efficiency

- Replaces energy portions of Executive Order 13123, issued in 1999 which required certain federal facilities to reduce energy intensity from FY 1999 baseline by 20% by 2005 and 25% by 2010.
- EPact 2005 requires federal agencies to reduce energy intensity every year in buildings on a BTU per gross square foot basis from 2003 baseline.
- Required reduction is 2% per year starting in FY 2006 up to 20% reduction by FY 2015 for federal facilities



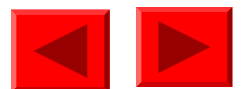
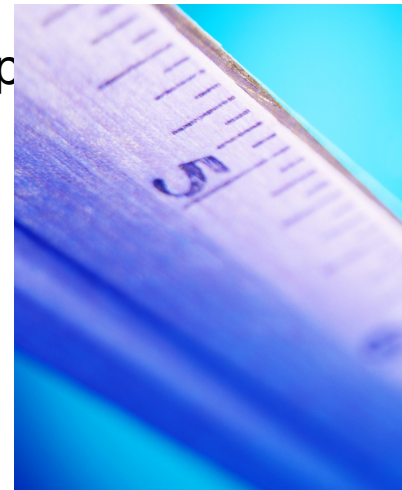
EPAct 2005-Energy Efficiency

Fiscal Year	Percent Required (2003 Baseline)
2006	2
2007	4
2008	6
2009	8
2010	10
2011	12
2012	14
2013	16
2014	18
2015	20



EPAct 2005-Energy Measurement & Accountability

- Agencies must have advanced metering capability (hourly measurements of electricity consumption and daily data reports) by 2012
- Data must be incorporated into Federal energy tracking systems and made available to Federal facility managers
- DOE must issue implementation guidelines by February 8, 2006 (180 days after enactment of the EPAct 2005)
- Six months after February 8, 2006, federal agencies must prepare implementation plan



EPAct 2005-Energy Star Requirements

Procurement of Energy Efficient Products

•Energy Star Product →

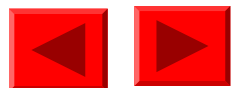
Product rated for energy efficiency

•Energy Star Program →

Established under Energy and Conservation Act

•FEMP Product →

Federal Energy Management Program product designated as being within the highest 25% of equivalent products for energy efficiency

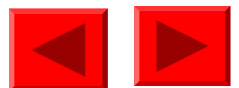


EPAct 2005-Energy Star Requirements

Procurement of Energy Efficient Products

To meet requirements for energy products, agency heads shall buy

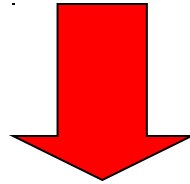
- Energy Star Product or
- FEMP designated product
 - Provisions are provided by EPact 2005 for exceptions
 - Acquisition of energy efficient products must be included in all procurements involving energy consuming products
 - General Services Administration (GSA) and Defense Logistics Agency (DLA) shall prominently display Energy Star and FEMP products in Federal Catalogs



EPAct 2005-Renewable Energy

Definition

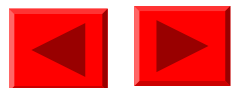
Renewable Energy – means electric energy generated from solar, wind ,biomass, landfill gas, ocean (including tidal, wave, current and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.



Renewable Energy Goals

- **Federal government goals for green power purchases**
- **FY2007- 2009: At least 3% of all electricity consumption must be derived from renewable sources**
- **FY 2010-2012: At least 5% of all electricity consumption must be derived from renewable sources**
- **FY2013+: At least 7.5% of all electricity consumption must be derived from renewable sources**

Note: Federal facilities receive double credit toward this goal for renewable energy is produced on-site, on federal land or Indian land

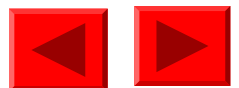


EPAct 2005-Petroleum & Home Heating Oil

- Strategic Petroleum Reserve (SPR) Provides Emergency crude oil supplies to United States
- EPact 2005 directs the Secretary of Energy to fill Strategic Petroleum Reserve (SPR) to its authorized one billion barrel capacity
- This requires Department of Energy to complete proceedings to select sites necessary to expand to one billion barrels



Reference: 2005 EPACT, Title III --- OIL AND GAS, Subtitle A



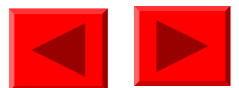
EPAct 2005- Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005

Congress declares that it is policy of United States that:

(1) Oil shale, tar sands, and other strategic unconventional fuels are important resources should be developed.

(2) Research and commercial development should be conducted in an environmentally sound manner.

(3) Development should occur with an emphasis on sustainability to benefit the United States.

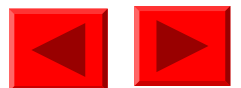


EPAct 2005-Task Force

- Secretary of Energy, with Secretary of Interior and Secretary of Defense shall develop a task force to coordinate commercial development of strategic unconventional fuels.
- Unconventional fuels shall include oil shale and tar sands in the United States.
- Task force shall also include the Governors of affected states and representatives of local governments in affected areas.



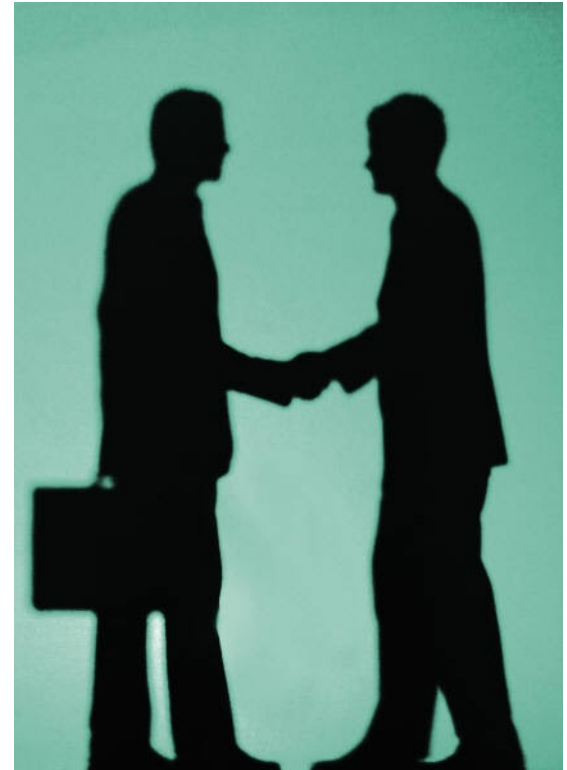
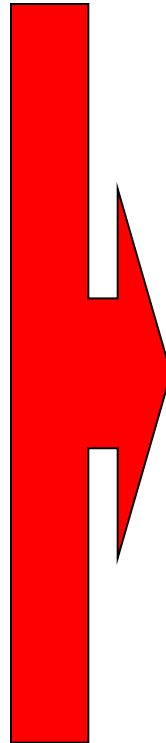
Reference: 2005 EPACT, Title III --- Section 369



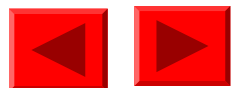
Partnerships

EPAct 2005-Partnerships

- Task Force shall make recommendations with respect to initiating partnership with Providence of Alberta, Canada and other nations that contain significant oil shale resources to share information.
- Task Force shall submit report not later than 180 days after enactment of the act.
- Task Force shall provide report each of five years after above 180 day report.
- DOE Office of Petroleum Reserves shall coordinate creation and implementation of strategic fuel development and work closely with Task Force



Reference: 2005 EPACT, Title III --- Section 369



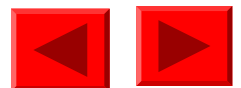
EPAct 2005-Procurement of Fuel Derived from Coal, Oil Shale, and Tar Sands

Use of Fuel to meet Department of Defense Needs

Secretary of Defense shall develop strategy to use fuel produced in whole or in part from coal, oil shale, or tar sands to meet DoD requirements when Secretary determines it is in national interest.

Clean Fuel Requirements - Fuel must meet standards for clean fuel procured from domestic sources as the Secretary of Defense shall establish for purposes of this section in consultation with Secretary of Energy.

Fuel Source Analysis -- To facilitate procurement by of covered fuel by DoD, Secretary of Defense may carry out comprehensive assessment of current and potential locations in United States for supply of covered fuel to the Department.



EPAct 2005: Coal

Clean Coal Power Initiative

\$200M per year authorized for fiscal years 2006-2014



Goal: To meet Year 2020 Goals

- (1) Removal of at least 99% of sulfur dioxide**
- (2) Emission of not more .05 lbs of NOx per million Btu**
- (3) Removal of at least 95% of mercury emissions**
- (4) Achieve a thermal efficiency of :**
 - (a) 50% for coal more than 9000 Btu**
 - (b) 48% for coal of 7000-9000 Btu**
 - (c) 46% for coal of less than 7000 Btu**

70% of funding must be allocated toward coal gasification projects
30% of the funding can be allocated for other related projects



EPAct 2005: Coal

Coal Gasification Project Types

Gasification combined cycle

Gasification fuel cells and turbine cycle

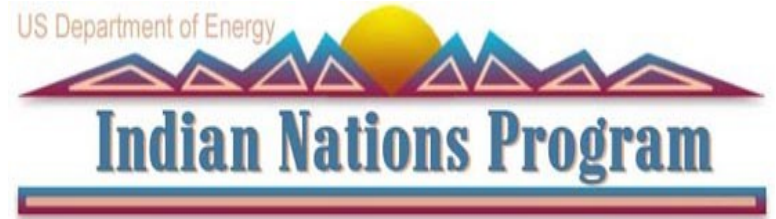
Gasification co-production

Hybrid gasification and combustion

Other advanced coal based technologies



EPAct 2005: Indian Energy Policy



Office of Indian Energy Policy and Programs

- (1) Promotes Indian tribal energy development, efficiency, and use**
- (2) Reduce to stabilize energy costs**
- (3) Enhance and strengthen Indian tribal energy and economic infrastructure relating to resource development and electrification**
- (4) Bring electrical power and service to Indian land and homes of tribal members located on Indian lands or acquired, constructed, or improved with Federal funds**



EPAct 2005: Indian Energy Policy



Power Allocation Study

Not more than two years after enactment of EPAct 2005, Secretary of Energy must prepare a report detailing the use of the Indian tribes of Federal Power allocated by the power marketing administration (Southwestern Power Administration)!!

Report to include:

- (1) Identification of quantity of power allocated for the benefit of Indian tribes**
- (2) The quantity of power sold to Indian tribes by any other power marketing administration**
- (3) Identification of barriers that impede tribal access to and use of Federal Power**



EPAct 2005: Wind & Hydropower Study (Indian Energy Policy)

Secretary of Energy with Secretary of Army will conduct a study for Wind energy generation on Indian Tribes and water power from the Army Corps of Engineers.

Study contents:

Feasibility of blending wind energy and hydropower from Missouri River dam

Review historical and anticipated requirements for power

Assess wind power potential on tribal lands and projected cost savings

Determine seasonal capacity needs

Include tribal engineer and **Western Area Power Administration on committee**

Incorporate Dakotas Wind Transmissions study where appropriate



EPAct 2005: Vehicles and Fuels

Subtitle A- Existing Programs

Highlights the several existing programs created by EPAct 1992 incl

Use of Alternative Fuels by dual fueled vehicles

Incremental Cost of Allocation

Alternative Compliance and Flexibility

Review of EPAct of 1992 Programs

Joint flexible fuel/hybrid vehicle commercialization initiative

Fuel cell school buses



**Reference: 2005 EPACT, Title VII, Subtitle A,
Section 704**

EPAct 2005: Vehicles and Fuels

Section 701: Use of Alternative Fuels Used by Dual Fueled Vehicles

Dual fueled vehicles must use alternative fuel

Except under the following scenarios:

- (1) Alternative fuel not reasonably available as determined by the Secretary of Energy
- (2) Cost of the alternative fuel is unreasonably more expensive relative to conventional fuel as determined by the Secretary of Energy.



Dept of Energy will also require annual reporting on quantities of vehicles purchased and quantity of alternative fuel consumed.

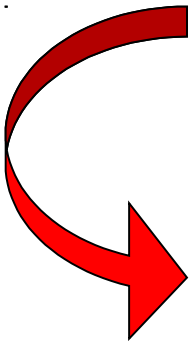


EPAct 2005: Vehicles and Fuels

Section 704

After this section is enacted, Secretary of Energy will determined the effects of Titles III, IV, V of the Energy Policy Act of 1992 on.....

- (1) The development of alternative fueled vehicle technology**
- (2) The availability of the technology on the market**
- (3) Cost of alternative fuels**



The study will also look at number of alternative fuel Vehicles, types of vehicles, amount of fuels purchased and used,



EPAct 2005: Vehicles and Fuels

Section 705: Report Concerning Compliance with Alternative Fueled Vehicles Purchasing Requirement

ESTABLISHMENT: “Secretary (Energy) shall establish a program to improve technologies for commercialization of:

- (1) A combination hybrid/flexible fuel vehicle
- (2) A plug-in hybrid/flexible fuel vehicle



This section replaces Section 310 (b) (1) of the Energy Policy Act of 1992.

The Compliance report is now effective -February 15, 2006



EPAct 2005: Vehicles and Fuels

Section 706: Joint Flex Fuel/Hybrid Vehicle Commercialization Initiative

Provides for grants that support technologies which achieve the greatest reduction in miles per gallon for petroleum fuel consumption.

Preference will be given to those proposal that

Involve technologies which achieve not less than 250 miles per gallon of petroleum fuel consumption

Have the greatest potential of commercialization to the general public within 5 years



EPAct 2005: Miscellaneous

Covers many distinct programs for motor vehicle emission conservation

Railroad Efficiency

Mobile Emission Reduction Trading and Crediting

Aviation Fuel Conservation and Emissions

Diesel Fueled Vehicles

Conserve by Bicycling Program

Reduction of Engine Idling

Biodiesel Engine Testing

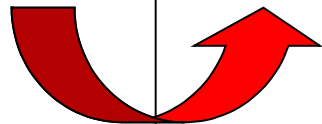
Ultra-Efficient Engine Technology for Aircraft

Fuel Economy Incentive Requirements



EPAct 2005: Aviation Fuel Conservation and Emissions

Action	Focus	Report Outputs
<p>FAA and EPA will jointly study:</p> <ul style="list-style-type: none">(1) Impact of aircraft emissions on air quality(2) Methods to promote fuel conservation(3) Methods to reduce air traffic inefficiencies	<p>The general output from the study will be to determine how air traffic inefficiencies (e.g. aircraft idling) result in unnecessary fuel burn and emissions!</p>	<p>Recommendations on reducing Unnecessary fuel burn and emissions Of aircraft that....</p> <ul style="list-style-type: none">-do not affect safety and security-human health



EPAct 2005: Hydrogen

Hydrogen and Fuel Cell Program

Purpose

- (1) Enable and promote comprehensive development and commercialization of fuel cell technology in partnership with industry.**
- (2) Make critical public investments in building strong links to private industry, academia/research institutes, and National Laboratories to expand growth.**
- (3) Build a mature hydrogen economy that creates fuel diversity in the transportation sector of the U.S.**
- (4) Decrease dependency on imported oil**
- (5) Create sustainable national energy economy**



EPA 2005: Hydrogen

Hydrogen and Fuel Cell Program

Key Definitions

Fuel Cell-

A device that directly converts the chemical energy and an oxidant into electricity by electrochemical processes occurring at separate electrodes in the device.

Heavy Duty Vehicle-

Motor vehicle rated at 8,500 gross vehicle weight or more than 6,000 lbs.

OR

has a basic vehicle frontal area in excess of 45 square feet

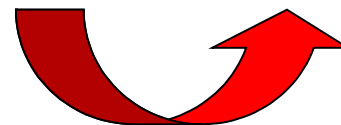
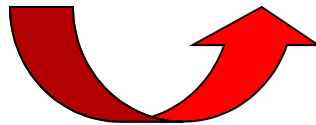
Light Duty Vehicle-

Motor vehicle rated less than 8,500 gross vehicle weight



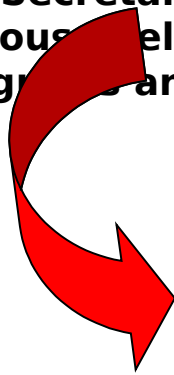
EPAct 2005: Hydrogen and Fuel Cell Task Force

Establishment	Plan/Objectives	Activities
<p>President shall establish an inter agency task force with the following representation:</p> <ul style="list-style-type: none"> (1) Secretary of Energy (chair) (2) Office of Science and Tech Policy (within Executive Ofc of President) (3) Dept of Transportation (4) Dept of Defense (5) Dept of Commerce (incl NIST) (6) Dept of State (7) EPA (8) NASA (9) Other appropriate agencies 	<p>Work toward:</p> <ul style="list-style-type: none"> (1) Safe, affordable, environmentally sound hydrogen logistic system (2) Incorporating fuel cells in all suitable applications including government (3) Distributed power generation including combined power, heat, clean fuels (incl hydrogen) (4) Uniform hydrogen standards (5) Vehicle hydrogen fuel system integrity safety performance 	<ul style="list-style-type: none"> (1) Foster technology exchange (2) Develop and inventory and assess hydrogen, fuel cells, etc. (3) Integrate info made available (4) Promote hydrogen in marketplace (5) Conduct education program for end users



EPAct 2005: Technical Advisory Committee

The Hydrogen Technical and Fuel Cell Advisory Committee is established to advise the Secretary of Energy on the various Fuel Cell and Hydrogen programs and activities



The committee will review:

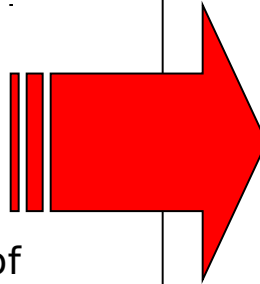
- **The implementation of the programs and activities**
- **The safety, economical, and environmental impact of technologies for the production, distribution, delivery, and storage of fuel cells/hydrogen**
- **The general 5 year implementation plan for fuel cells (section 804)**



EPAct 2005: Energy Research and Development

PURPOSE

- Increase efficiency of energy intensive sectors through technology and conservation
- Promote diverse energy supply
- Improve energy security for U.S.
- Decrease environmental impact of energy related activities.



GOALS

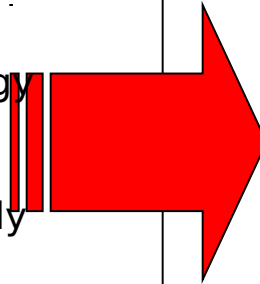
- Energy efficiency for buildings, vehicles, and energy consuming industries
- Electric energy generation, transmission, And storage
- Renewable energy technologies, e.g. wind, solar, geothermal, hydrogen, hydropower, biomass, etc.
- Fossil energy power generation and gas recovery



EPAct 2005: Renewable Energy

OBJECTIVES

- Increase conversion efficiency of all forms of renewable energy through improved technology
- Decrease cost of renewable energy generation
- Promote diversity of energy supply
- Decrease environmental impact of energy related activities
- Improve energy security
- Increase export of renewable generation equipment from the U.S.



PROGRAMS

Solar Power

Wind Energy

Geothermal Energy

Hydropower

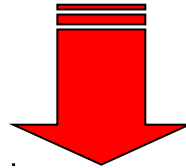
Approaches to combine technologies for power generation



EPAct 2005: Bioenergy Program

Definition: Biomass- (a) any organic material grown for the purpose of energy conversion
(b) any organic byproduct of agriculture that can be converted to energy
(c) any waste material which can be converted into energy

Lignocellulosic Feedstock- any portion of a plant or coproduct from conversion of agricultural crops, not specifically grown for food.



Bioenergy Program

Development and commercialization of:

- (1) Biopower energy systems
- (2) Biofuels
- (3) Bioproducts
- (4) Integrated biorefineries that may produce biopower, biofuels, and bioproducts



EPAct 2005: Boutique Fuels

Definition: Boutique fuels are specialized blends produced for a specific state or area of the country to meet state and local air quality requirements. They offer air quality and public health benefits at minimal costs.

Boutique fuel requirements make it more difficult to move gasoline supplies throughout the country in the event of a fuel supply disruption and may lead to local supply shortages.

Source: <http://www.epa.gov/otaq/boutique.htm>

EPAct 2005 provides direction for Boutique Fuels involving:

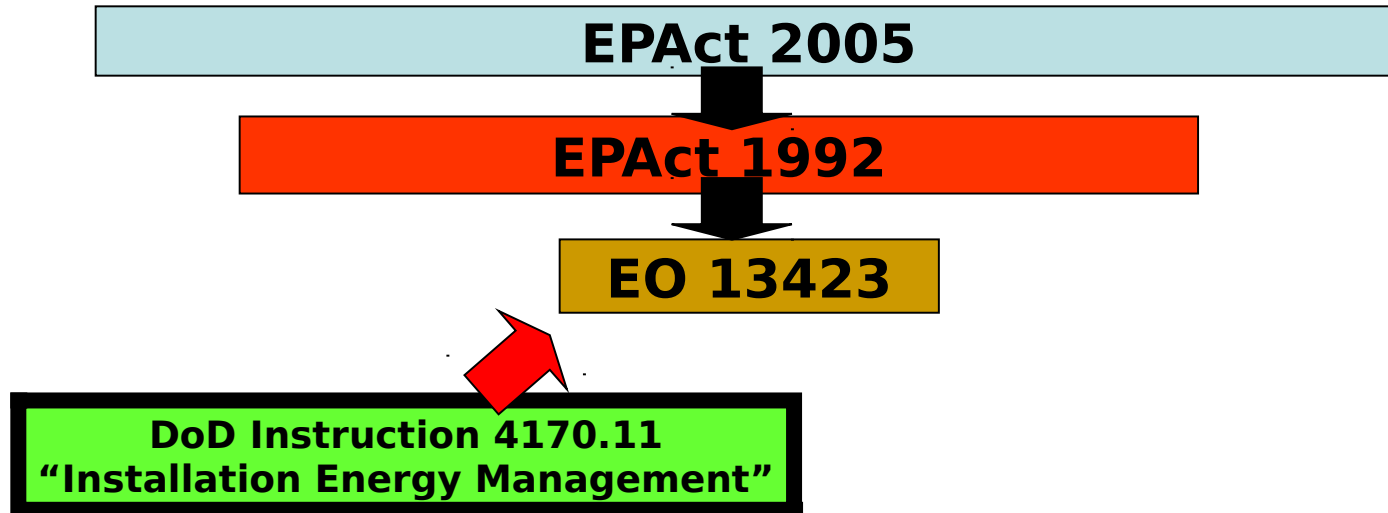
Temporary waivers of boutique fuels during supply emergencies

Limit on the number of boutique fuels

Congressional Study on boutique fuels



Department of Defense Compliance



Stated Goals include:

- (1) Reduction in emissions and improvement in energy mgmt
- (2) **Leadership** to promote energy efficiency, water conservation
use of renewable energy and emerging technologies



Link to <http://www.acq.osd.mil/ie/irm/Energy/Energy.htm> for more details

Department of Defense Compliance

EPAct 2005

EPAct 1992

EO 13423

**DoD Instruction 4170.11
“Installation Energy Management”**

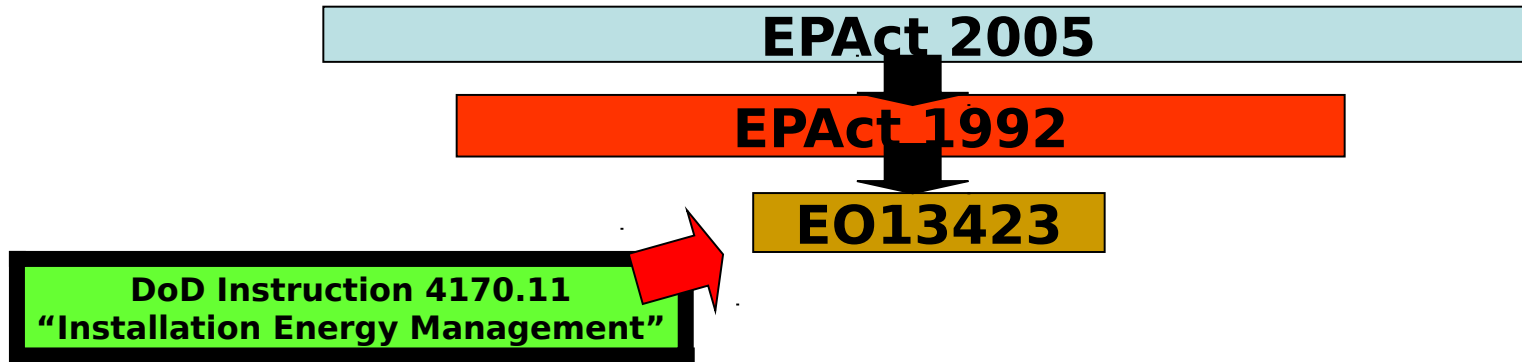
Policy Development and Implementation

- **Coordination through OSD-led inter-service working group**
- **Members Represented: Army, Navy, Air Force, Office of DUSD (I&L) (IRM)**
- **IPTs Created as required**



Link to <http://www.acq.osd.mil/ie/irm/Energy/Energy.htm> for more details

Department of Defense Compliance



Current Progress

- Secretary of Army published Army Energy Strategy for Installation
- Vice Chief Memo on Energy Conservation and Under Secretary of Air Force Senior Focus
- Assistant Secretary of Navy memo directed energy conservation



Link to <http://www.acq.osd.mil/ie/irm/Energy/Energy.htm> for more details

Current Progress (con't)

Installations

- DoD leads fed government in renewable energy – almost 9% electricity in FY05; Goal to achieve 25% by 2025
- Services reduced facilities energy use by about 30% from the 1985 baseline
- Navy awarded a second geothermal power plant in FY05; Wind-diesel power plant at Guantanamo Bay
- Air Force – 7 smaller geothermal plants
- Energy Saving Performance Contracts widely used to defer costs (as of January 2007 DESC has 9 ESPC contracts)

Platforms

- DoD has doubled investment last five years for Energy & Power Tech Initiative. RESULT: enhanced batteries, fuel cells, etc...
- Army leading DoD effort to qualify Joint Battlefield Fuel & testing synthetic fuels in medium tactical vehicles
- Navy energy conservation program reduced use 15% for ships; 6% aircraft
- Air Force leading DoD effort to test synthetic fuels in aircraft (200K gallons)
- DLA RFI (20 bidders) for 200M gallons synthetic fuel

Energy Policy Act of 2005 requires further reduction for installations

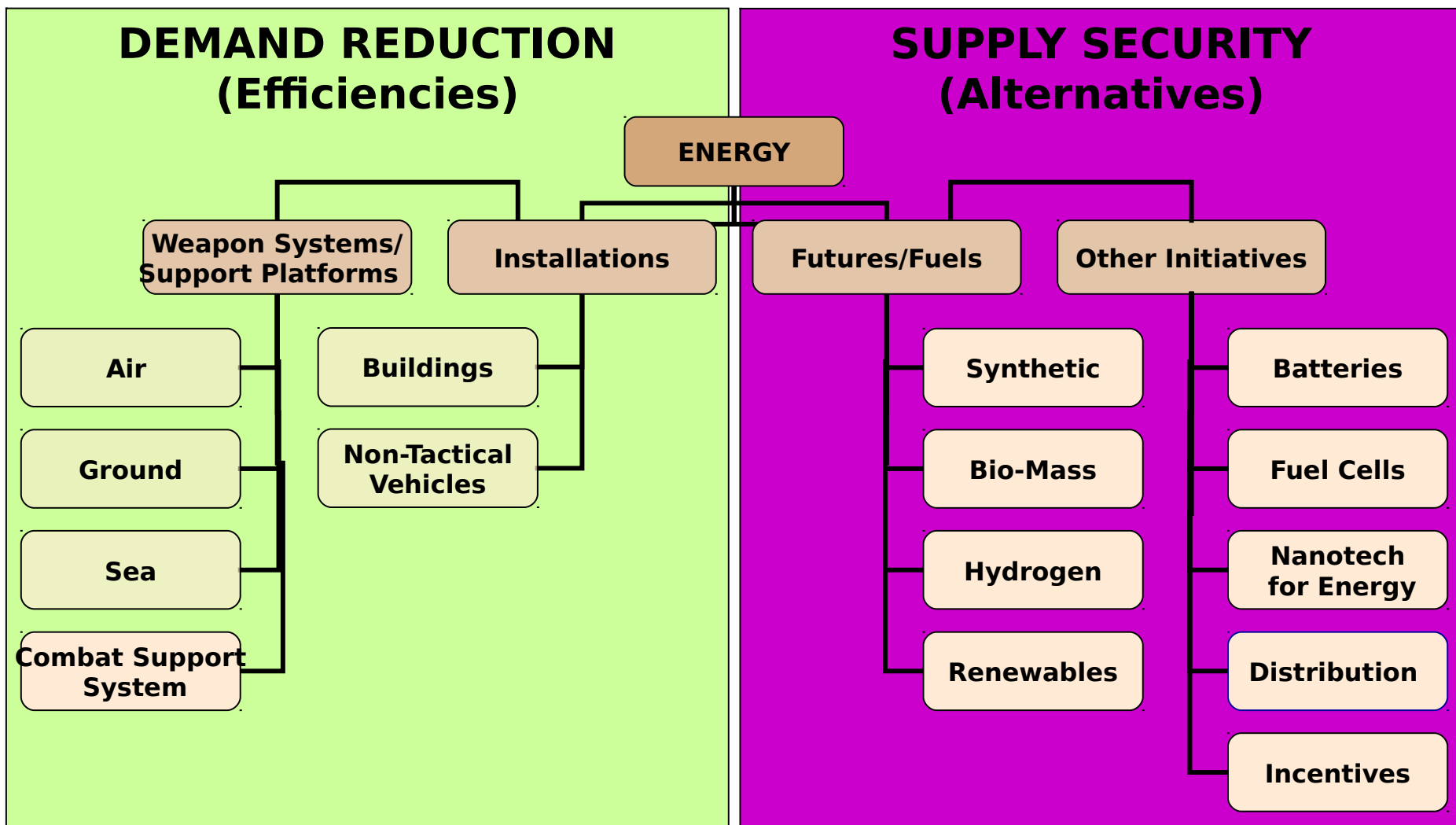
Conservation Improvement

Program

Subject matter experts that supply information to the IPTs—R&D group add back in



Taxonomy of Baseline Program




Recommendations

- **Create assured fuels office**
 - Mature and test synthetic/alternative fuels
 - Measure and assess DoD energy progress
 - Develop incentives programs for alternate fuel industry
- **Increase platform efficiency**
 - Incorporate delivered cost of fuel in acquisition decisions
 - Develop and test efficient propulsion systems, power generators and machinery
 - Develop / prototype light weight vehicles and structures
 - Strive for operational efficiencies and simulation use
- **Reinvigorate installations' initiatives**
 - Meet or accelerate energy efficiency goals
 - Include non-tactical vehicles
 - Expand Energy Conservation Investment Program / Energy Saving Performance Contracts



EPAct 2005: Alternative Fuels Task Force

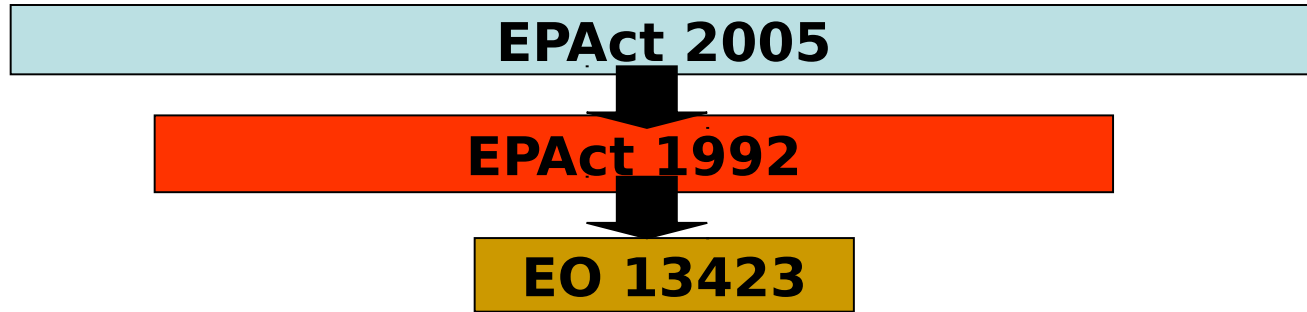
Issue	Recommendation	Implementation
No single entity in the DoD responsible for coordinating the development, test, and certification of synthetic fuels	Create an assured fuels office at responsible for: <ul style="list-style-type: none">• Development, testing, and certification of alternate/synthetic fuels• Developing metrics and measurement campaign for synthetic fuels• Developing and implementing a strategy for providing incentives for industry to develop a synthetic fuels capacity in the United States	Stand up office in FY07 as a pilot program with long-term detailees Skill set needed: Logisticians (fuel supply & distribu Technologists; Venture Capitalist (IPA); Operations Research Analyst; Service Operators; Environmental Engineer; Contracting Specialist (on call) invite DOE representatives



- Oversight provided by the Energy Security Senior Steering Group (twice annual meetings)
- At the end of the two year pilot, the Senior Steering Group will recommend whether or not to make the office permanent.
- Seed office with operating / study money (est \$10M in FY07 / FY08)
- Office will not conduct the specific tests, but coordinate DoD wide efforts, and look to leverage DOE work



Summary



The listener should now understand.....

- Purpose of EPact 2005
- Summary of Basic Provisions of EPact 2005
- Provisions Applicable to the Department of Defense (DoD)
- How Compliance with EPact is being pursue by the DoD
- Summarized Requirements of Department of Defense Instruction 4170.11 “Installation Energy Management”

